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Mission Management Aircraft Operations Manual

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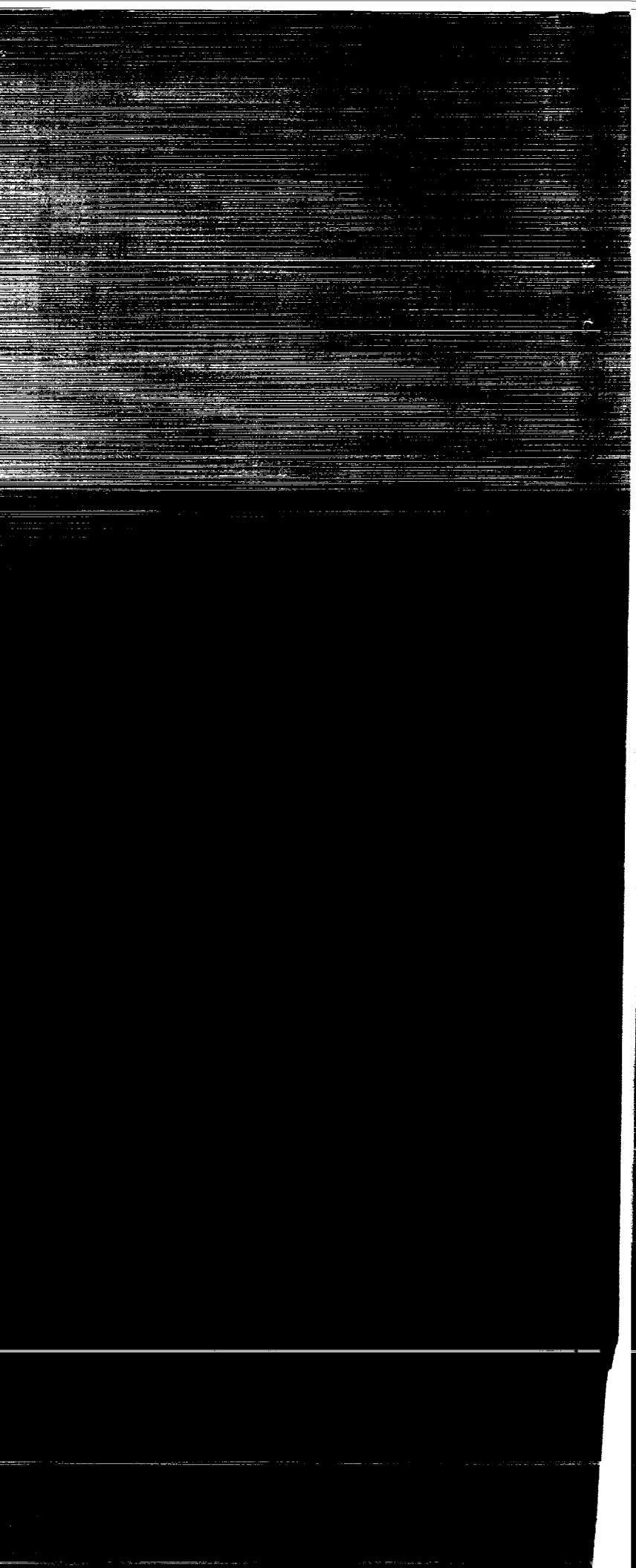

ORGANIZATION OF THE NASA MISSION MANAGEMENT
AIRCRAFT OPERATIONS MANUAL

EFFECTIVE DATE:
March 1992

This Manual is issued in loose-leaf form and revised by page changes. Field Installations have the option of adding supplements to this Manual. Copies of supplements will be provided to the Chief, Aircraft Management Office, for review and, if appropriate, distribution to other users of this Manual.

Comments and questions concerning this Manual should be addressed to the Chief, Aircraft Management Office, Code JIF, NASA Headquarters, Washington, DC 20546.

This Manual cancels NHB 7920.3, dated January 9, 1986.

Director, Logistics, Aircraft,
and Security Division

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CHAPTER 1 - GENERAL

100. PURPOSE

This Manual prescribes the NASA mission management aircraft program and provides policies and criteria for the safe and economical operation, maintenance, and inspection of NASA mission management aircraft.

101. POLICY

1. The operation of NASA mission management aircraft is based on the concept that safety has the highest priority. Operations involving unwarranted risks will not be tolerated.

2. NASA mission management aircraft will be designated by the Associate Administrator for Management Systems and Facilities.

3. NASA mission management aircraft are public aircraft as defined by the Federal Aviation Act of 1958. Maintenance standards, as a minimum, will meet those required for retention of Federal Aviation Administration (FAA) airworthiness certification. Federal Aviation Regulation Part 91, Subparts A and B, will apply except when requirements of this Manual are more restrictive.

102. RESPONSIBILITIES

The responsibilities and positions described in this section are established as guidelines. Recognizing there is no single standard NASA organization, deviations are permitted in order to fit particular organizational structures and position titles. However, in order to facilitate standardization and communications among Field Centers, deviations should be kept to the minimum necessary. Mission management aircraft responsibilities are also described in NHB 7900.3 (V1), Chapter 3, paragraph 303.

1. Chief of Aircraft Operations. At each Installation operating mission management aircraft, the chief of aircraft operations or designated representative will be a member of the Mission Management Aircraft Operations Subpanel of the Intercenter Aircraft Operations Panel (IAOP) and is responsible for:

   a. Supervision of the mission management aircraft operation.

b. Ensuring that the operations and maintenance policies established by the Administrator are complied with.

c. Keeping abreast of the latest developments and techniques in aircraft operations and maintenance standards.

d. Establishing an internal information system to include periodic flight crew meetings and a required reading information file for important operational and safety information.

e. Evaluating local recommendations for improved safety and efficiency of mission management aircraft operations. If appropriate, approved recommendations should be submitted to the IAOP or the mission management aircraft subpanels for possible NASA-wide adoption.

2. All Flight Crewmembers

a. The primary responsibility of all crewmembers will be to maintain the highest standards of safety in the conduct of flight operations. Although passenger service, courtesy, promptness, and reliability are basic responsibilities, they must always be secondary to safety.

b. Responsibility for the safe completion of every flight mission rests with each individual crewmember connected in any manner with the conduct of the assigned mission. However, the ultimate responsibility for decisions with respect to safety of flight rests with the assigned pilot-in-command.

c. All crewmembers will comply with the provisions set forth in this Manual and the following directives, as applicable:

(1) The airplane flight manual for the type aircraft they are operating.

(2) The operating procedures and characteristics of any accessories, instruments, or electronic equipment utilized on the aircraft.

(3) Pertinent operations and maintenance instructions or bulletins.

(4) Federal regulations applicable to the operation of public aircraft.

(5) Air Traffic Control (ATC) procedures.

(6) Instructions covering emergency equipment aboard aircraft and procedures for aircraft in distress, ditching, evacuation, and survival.

3. Pilot-in-Command (PIC). An aircraft commander qualified in accordance with Chapter 2, will be designated as PIC and charged with responsibility of conducting each NASA mission management flight. The PIC is responsible for:

a. Exercising complete authority without limitation to command and supervising all assigned crewmembers during flight and crew duty time.

b. Exercising final authority to delay or divert a flight for operational reasons such as for weather, aircraft conditions, or pilot fatigue. The PIC will not be overruled by persons embarked. A decision to delay or divert a flight for the above reasons on the grounds of safety will not be the basis for disciplinary action.

c. Giving full and undivided attention to professional responsibilities and foregoing any outside interests which might interfere with exercising his or her fullest abilities and aeronautical skills. Outside problems (such as financial, domestic, or health) which might interfere with professional responsibilities will be discussed with superiors for assistance or temporary release from flight status.

4. Second-in-Command (SIC). The pilot assigned to duty as SIC during flight will be qualified in accordance with Chapter 2 and designated as either an aircraft commander, first pilot, or second pilot. It is the SIC's responsibility to assist the PIC and to be able to assume command in the event of the PIC's absence or incapacitation.

a. A first pilot will be a highly qualified copilot who may, at the discretion of the PIC, fly the aircraft from either the left or right seat on both passenger and training missions.

b. A second pilot will be a qualified copilot who may, at the discretion of the PIC, fly from the left seat on missions when no passengers are on board, such as ferry or training missions. A second pilot may not make takeoffs or landings from either seat with passengers on board.

5. Quality Assurance Supervisor. The quality assurance supervisor is responsible for the quality of maintenance and for assisting the chief of aircraft operations and the chief of aircraft maintenance in carrying out their basic maintenance responsibilities. He/she is responsible for:

a. Supervising and training quality assurance inspectors.

b. Establishing procedures to ensure that maintenance and repair work on the aircraft, engines, and accessories conform to the requirements and standards established by this manual and other pertinent directives.

c. Advising the chiefs of aircraft operations and of aircraft maintenance of all pertinent technical matters and requirements.

d. Maintaining a suitable technical library, including the recording of technical order changes, safety-of-flight items, and manufacturers' bulletins or changes.

e. Maintaining adequate records and data on discrepancies to enable establishment of trends with a specific objective of determining when discrepancies in any area are increasing or otherwise showing an unfavorable trend.

6. Quality Assurance Inspector. The quality assurance inspector is responsible to the quality assurance supervisor for:

a. Inspecting work performed and material used in the modification, repair, maintenance, and service of the airframes, power plants, propellers, and accessories.

b. Ensuring that all work guides, check-off lists, check sheets, and flight forms are properly used, filled out and authenticated.

c. Ensuring that appropriate test equipment is available and calibrated within the required time and tolerance criteria.

d. Inspecting all aircraft parts and equipment received for use or storage, to determine proper identification and to ensure that the material condition of these is satisfactory upon receipt.

e. Ensuring that appropriate functional checks are performed on all systems, parts, and accessories after maintenance and/or repair is effected.

7. Chief of Aircraft Maintenance. The chief of aircraft maintenance will normally be a member of the Mission Management Aircraft Maintenance Subpanel of the IAOP and is responsible to local line management for the supervision and control of all aircraft maintenance functions, including but not limited to:

a. Implementing a functional system as developed by the IAOP to ensure that all aircraft maintenance tasks are accomplished with the highest possible degree of professionalism.

b. Maintenance cognizance of the latest developments and techniques in aircraft maintenance and serving as technical advisors to the chief of aircraft operations or to local line management, as appropriate.

c. Maintaining active training and safety programs.

d. Serving as liaison and technical representative when maintenance tasks are accomplished by contract.

e. Evaluating local recommendations for improving mission management aircraft maintenance and inspection procedures. If appropriate, approved recommendations should be submitted to the Mission

Management Aircraft Maintenance Subpanel for possible NASA-wide application.

f. Keeping the chief of aircraft operations advised as to the:

(1) Daily status of the aircraft.

(2) Periodic inspection scheduled and nonroutine maintenance requirements.

(3) Logistics requirements.

(4) Personnel requirements.

g. Preparing and maintaining aircraft maintenance records and submitting periodic reports.

8. Maintenance Supervisor. The maintenance supervisor is responsible to the chief of aircraft maintenance for:

a. Work assignments and direct supervision of the mechanics.

b. Keeping the chief of aircraft maintenance advised of work progress.

c. Ensuring that all established shop and line safety and fire regulations are observed.

d. Ensuring that good housekeeping rules are observed in all work areas.

e. Reviewing work orders, flight logs, and discrepancy reports for delayed or recurring discrepancies.

f. Knowing all provisions and requirements of applicable technical directives, bulletins, and letters.

g. Ensuring that tools and ground service equipment are serviceable and properly used.

9. Mechanic. The mechanic is responsible for carrying out all instructions and work assignments with skill, care, and judgment and for:

a. Keeping strict account of tools.

b. Referring to the appropriate manufacturer's manuals for detailed specifications and instructions.

c. Advising his/her supervisor of any unusual or abnormal mechanical condition found.

d. Filling out and authenticating all check sheets, inspection verification records, and reports required in the accomplishment of assigned tasks.

10. Flight Mechanic. The flight mechanic, when assigned to a mission management aircraft flight, is responsible to the PIC for:

a. Correcting minor mechanical discrepancies and supervising major repairs enroute.

b. Performing preflight and postflight inspections and ensuring the aircraft is properly serviced.

c. Ensuring passenger/cargo manifests and weight and balance data are accurate and complete.

d. Ensuring the safety and comfort of the passengers.

e. General cleanliness of the aircraft and cabin.

103. WAIVERS AND SUPPLEMENTS

1. Waivers. When deviations from this Manual are necessary, submit requests for waivers from the Field Installation Director through the appropriate Program Office to the Chief, Aircraft Management Office, Headquarters. Prior written approval from the Associate Administrator for Management Systems and Facilities will be obtained before implementing procedures that are less restrictive than those contained in this Manual.

2. Supplements. Appendix B is reserved to provide Field Installations with a means for establishing, within a single document, local guidance appropriate to mission management aircraft operations. Copies of supplements should be provided to the Chief, Aircraft Management Office, for review and, if appropriate, distribution to other users of this Manual.

CHAPTER 2 - FLIGHT CREW QUALIFICATIONS

200. DESIGNATION

Prior to assigning personnel to flight crew duties on NASA mission management aircraft, the requirements of this Chapter must be accomplished; the crewmember must be designated in writing to his/her crew position; and all required training must be documented in the individual's training file.

201. TRAINING FILE

A training file will be maintained for each flight crewmember. This file will contain all documentation pertaining to crew qualification and training. The documents may be retained by the crewmember upon his/her termination of assignment. The file will contain the following minimum documentation.

1. Qualifications. File will contain copies of certificates of professional and medical qualifications; e.g., copies of pilots or mechanics licenses and will contain a copy of the letter designating the individual to his/her current crew position.

2. Ground Training. File will contain a list of ground training accomplishments (including simulator training) showing dates, location, and amount of training. A record of refresher training must be maintained for the past 2 calendar years.

3. Flight Training. File will contain a list of flight training accomplishments and flight evaluations for the past 2 calendar years.

202. PREREQUISITES

Before being designated to the indicated crew position, personnel must satisfy the following requirements:

1. All Pilots. Possess an FAA First Class Medical Certificate issued within the past 12 months by a NASA-approved medical examiner.

2. Aircraft Commanders

a. Possess an FAA Airline Transport Pilot (ATP) Certificate with a type rating, if appropriate, in the aircraft assigned.

b. Have been certificated a pilot for at least 5 years and must meet the following minimum flight experience requirements.

(1) 2,500-pilot hours (500 multiengined).

(2) 200-pilot hours in type.

(3) 200-instrument-pilot hours (100 actual).

c. In exceptional circumstances, the 200-pilot hours in type requirement may be reduced if the pilot is qualified in similar type. The justification will be submitted to the Chief, Aircraft Management Office, NASA Headquarters.

3. First Pilots

a. Possess an FAA Airline Transport Pilot Certificate with a type rating in the aircraft assigned, if appropriate.

b. Have flown at least 50 hours in type.

4. Second Pilots

a. Possess an FAA Commercial Pilot Certificate with appropriate category, class, and instrument ratings.

b. Have flown at least 10 hours in type, 8 of which may be in an approved simulator.

5. Flight Examiners. Pilot flight examiners will be selected by the chief of flight operations from highly qualified pilots who have demonstrated the skill, maturity, and temperament to perform evaluator duties.

6. Instructor Pilots. Instructor pilots will be selected by the chief of flight operations from highly qualified aircraft commanders who have demonstrated the skill, maturity, and temperament to perform instructor duties.

7. Flight Mechanics. Flight mechanics must possess either an FAA Mechanic Certificate or be a NASA designated aircraft mechanic. They must possess at least an FAA Third Class Medical Certificate issued within the past 12 months by a NASA-approved medical examiner.

203. CREWMEMBER TRAINING

The mission management aircraft training program is established to ensure that each crewmember is adequately trained to perform his/her assigned duties safely and proficiently. To the extent practical, procedures training will be standardized for each type of mission management aircraft. The NASA Headquarters Aircraft Management Office, through the appropriate Mission Management Aircraft Operations Subpanels of the IAOP, will be responsible for the development, review, and approval of standardized aircraft operating procedures.

204. GROUND TRAINING PHASE

1. Survival Training. Each crewmember will receive basic survival training on a one-time basis. Additional survival training may be required by appropriate Center management for those crewmembers engaged in frequent over water or remote area flights. Appropriate training received prior to NASA employment, such as military survival training courses, may be credited for this requirement. Newly assigned personnel, with no previous survival training, must complete this requirement within 6 months of being assigned to flight crew duties. Pilots will not be designated PIC until this requirement is satisfied.

2. Physiological Training. Prior to initial designation and every 4 years thereafter, crewmembers will receive instruction in the physiological aspects of high altitude flight including altitude chamber indoctrination.

3. First-Aid Training. Every 3 years crewmembers will receive instruction in basic first-aid including, if available, cardiopulmonary resuscitation (CPR) procedures. Newly assigned personnel, with no previous first-aid training, must complete this requirement within 6 months of being assigned to flight crew duties. Pilots will not be designated PIC until this requirement is satisfied.

4. Emergency Egress Training. Prior to initial designation and annually thereafter, each crewmember will receive emergency egress training on each type aircraft assigned. Training should include instruction on the location and operation of normal and emergency exits and cabin emergency equipment such as fire extinguishers and life vests.

5. Aircraft Systems Training. Each crewmember will complete an approved formal course of instruction in the type aircraft to be flown, including a study of the systems and procedures applicable to the individual's crew position. The term "formal" course refers to a manufacturer's course, commercial course, or other course approved by the appropriate Mission Management Aircraft Operations Subpanel.

   a. Initial Training. Prior to initial designation, each crewmember will complete a formal systems training course consisting of a minimum of 20 hours of academic training.

   b. Refresher Training. A formal systems training course is required each 6 months for pilots and each 18 months for flight mechanics. The course will consist of a minimum of 7 hours of academic training. At the discretion of the chief of aircraft operations, this requirement may be modified for aircraft commanders who have at least 3 years experience and 500-hours flying time in the type aircraft to which assigned. In these instances, a 7-hour local refresher ground training course may be substituted for alternate formal courses.

205. FLIGHT TRAINING PHASE

Flight training is designed to provide the crewmember with hands-on experience under controlled conditions. Flight training will be conducted under the supervision of a NASA designated flight examiner or instructor pilot or an FAA-certificated flight instructor either in an approved simulator or in the aircraft.

Flight training, except for normal transportation procedures, will not be conducted while passengers are on board.

1. Initial Pilot Training. Prior to initial designation, each pilot will receive a minimum of 10 hours of flight training, 8 hours of which may be conducted in a simulator.

2. Refresher Pilot Training. In each 6-month period, pilots will receive a minimum of 6-hours flight or simulator training. At least one-half of this training will be completed in the pilot's (left seat) position. Because of the safety and efficiency provided by modern visual, motion simulators, maximum use should be made of these facilities to satisfy this training requirement.

   With the approval of the chief of aircraft operations, the 6 hours of flight or simulator training may be waived for temporary pilots serving in a second pilot capacity providing all other applicable requirements of this Manual are met, and that the temporary pilot successfully complete a proficiency and instrument competency check in type by an approved NASA flight examiner within the preceding 6 months.

3. Flight Mechanic Training. Prior to initial designation, each flight mechanic will receive training in such areas as traffic awareness and see and avoid techniques, aircraft servicing, weight and balance, and passenger care. This training may be conducted on a regular passenger mission under the supervision of a fully qualified flight mechanic or aircraft commander. Initial training will consist of at least two passenger missions. At least one mission will include an overnight stop away from home station.

206. OVERDUE TRAINING

Refresher ground and flight training will be considered overdue if not completed within 2 months of the specified due month. Crewmembers with overdue training will not be used as a required crewmember on any passenger missions until the required training is completed.

207. RECENT EXPERIENCE

To ensure all crewmembers have the opportunity to exercise their aeronautical skills and thereby maintain the proficiency level to which they have been trained, the following minimum recent experience requirements are established:

1. Pilots. Tables I and II set forth the recent pilot flight experience requirements:

TABLE I

SINGLE CURRENCY

Requirement	Aircraft Commander	First Pilot	Second Pilot
Previous 3 Calendar Months (In type)			
Pilot/Co-pilot Hours	40	30	20
Instrument Hours	4	4	2
Precision Approaches	4	4	2
Non-precision Approaches	2	2	-
Landings (Total)	6	6	2
Landings (Night)	3	3	1
Previous 2 Calendar Months (In type)			
Pilot/Co-pilot Hours	10	5	5
Precision Approaches	2	2	1
Landings	2	2	1

Note: Total "Pilot/Co-Pilot Hours" may include simulator hours.

Instrument hours, approaches, and landings (including night landings) may be accomplished in an approved visual, motion simulator.

TABLE II

MULTIPLE CURRENCY

Requirement	Aircraft Commander		First Pilot		Second Pilot	
	All Types	In Type	All Types	In Type	All Types	In Type
Previous 3 Months						
Pilot/Co-pilot Hours	40	10	30	8	20	5
Instrument Hours	4	2	4	2	2	-
Precision Approaches	4	2	4	2	2	-
Non-Prec. Approaches	2	1	2	1	-	-
Landings (Total)	6	3	6	3	2	1
Landings (Night)	3	1	3	1	1	-
Previous 2 Months						
Pilot/Co-pilot Hours	10	4	5	2	5	-
Landings	2	1	2	1	1	-
Precision Approaches	2	1	2	1	1	-

Note: Requirements under "All Types" are not limited to mission management aircraft. Total "Pilot/Co-pilot Hours" may include simulator hours. Instrument hours, approaches, and landings (including night landings) may be accomplished in an approved visual, motion simulator.

2. Flight Mechanics. To maintain currency, flight mechanics must have flown at least one trip each calendar quarter or they will be accompanied by a current flight mechanic.

208. OVERDUE RECENT EXPERIENCE

The following requirements apply to pilots overdue the recent experience provisions of paragraph 207.

1. Total Pilot Hours. Aircraft commanders and first pilots who do not meet the 3 calendar month total hour requirements, but are otherwise current, will increase all instrument approach minimums by 200 feet and 1/2

mile visibility (or the Runway Visual Range equivalent) but in no case may the minimum be less than 400 foot ceiling and 3/4 mile visibility.

2. Step-down Qualifications. Aircraft commanders and first pilots who are otherwise current but fail to meet the requirements of paragraph 207 may revert to first pilot or second pilot status, if current in that position, until the recent experience provisions for aircraft commander are satisfied.

3. Multiple Currency. Pilots flying multiple types of aircraft who satisfy all the multiple currency requirements (all types) may satisfy the in type currency requirement, except the night landing requirement, by flying a training flight with a flight instructor or examiner pilot. This training flight must include a minimum of two instrument approaches, two takeoffs, and two landings.

4. Night Landing Currency. Pilots not meeting the night landing currency requirements of paragraph 207 will not conduct night landings with passengers on-board, but may be otherwise utilized, until the night landing requirements are satisfied. Night landing requirements may be accomplished in an approved visual, motion simulator.

5. Disqualification. Crewmembers delinquent in any recent experience requirement, except as modified above, are disqualified for passenger flights. Disqualification up to 3 months requires requalification in items deficient or a proficiency flight check with a flight examiner pilot. Disqualification over 3 months requires retraining in accordance with paragraphs 204 and 205, and a formal flight evaluation by a flight examiner pilot.

209. EVALUATION PHASE

The intent of the NASA flight crew evaluation program is to objectively evaluate aircrew performance and thereby measure the effectiveness of our training program. Designated flight examiners will administer all flight checks.

1. Proficiency. Prior to being designated in their crew position, and annually thereafter, pilots must complete a proficiency evaluation flight conducted by a NASA or FAA-designated flight examiner pilot. When maintaining qualifications in more than one type

aircraft, a proficiency evaluation flight in each aircraft is required/annually. Except for the initial check, proficiency checks may be accomplished in an approved simulator by an FAA designated examiner.

2. Line Checks. Prior to being designated an aircraft commander and annually thereafter, pilots must complete a line evaluation flight conducted by a flight examiner. When maintaining qualification in more than one type mission management aircraft, a line evaluation in each aircraft is required annually. Line checks will be conducted on typical passenger missions.

3. Documentation. Flight checks conducted by NASA flight examiners will be recorded on NASA Form 1615, reviewed by the chief of aircraft operations and filed in the individual's training file. Normally, all appropriate items indicated on the Form 1615 will be evaluated during the flight checks. Flight examiners are urged to include meaningful remarks and recommendations on the NASA Form 1615. This will aid in focusing future training on appropriate areas.

4. Overdue Flight Checks. Flight checks will be considered overdue if not completed within 2 months of the specified due month. Pilots with overdue line checks will not be designated as PIC. Pilots with overdue proficiency checks will be scheduled only on training flights (i.e., nonpassenger flights) with a qualified examiner or instructor pilot.

CHAPTER 3 - CREW COMPLEMENT AND SCHEDULING

300. GENERAL

All personnel scheduled as primary flight crewmembers on NASA mission management aircraft passenger flights will be trained and qualified in accordance with Chapter 2 of this Manual. Crew assignment, including identification of pilot in command, will be designated in writing for each flight.

301. CREW COMPLEMENT

1. Basic Crew. No aircraft carrying passengers will be operated with less than the minimum basic crew specified below:

a. Gulfstream G-I, G-III	Aircraft Commander Co-pilot Flight Mechanic
b. King Air B-200	Aircraft Commander Co-pilot

2. Augmented Crew. A crew may be augmented by adding one additional aircraft commander to the basic crew. Additional crewmembers may be added at the discretion of the chief of aircraft operations.

302. CREW DUTY TIME

1. Definition. Crew duty time is the total time a crew is on duty before the final termination of a flight. Crew duty time accrues consecutively and begins when a crew reports to a designated place of duty to start preparation for a flight and ends when the engines are cut at the end of the flight or series of flights. Crew duty will normally commence at least 1 hour before scheduled departure time in order to provide adequate time for flight preparation. This does not preclude using personnel as crewmembers who commenced other duties before reporting for a flight; however, in this case the crew duty time for the entire crew begins at the time these other duties commenced.

2. Duty Time Limitations. Basic crew duty time will not be scheduled to exceed 14 consecutive hours except as set forth below:

   a. The chief of aircraft operations may, for a particular flight, extend the basic crew duty time to 16 hours if the total time of crew duty is

confined to the period between 4:00 a.m. and 12:00 midnight (local time at departure point). The aircraft must be pressurized and have a functional autopilot.

b. Augmented crew duty time will not be scheduled to exceed 20 consecutive hours. The aircraft must be pressurized and have a functional autopilot.

c. Relief crews should be prepositioned if the mission schedule cannot be supported within the duty time limitations specified for a single crew.

303. CREW REST

1. Definition. Crew rest is a period of time provided to flight crewmembers for necessary rest, eating, and local transportation prior to participating in flight crew duties. Crew rest will be provided prior to departure from the home station as well as at enroute stops when mission schedule or crew duty limitations prevent the aircraft from returning to the home station.

2. Crew Rest Limitations

a. Crew rest will normally provide at least 10 consecutive hours free of all official duties.

b. At enroute stops, crew rest will not normally commence until 1 hour after termination of the mission in order to allow for necessary post-flight duties.

c. The crew rest period ends when the crew begins official duties in preparation for departure, normally at least 1 hour prior to scheduled take-off time.

d. In exceptional circumstances, the chief of aircraft operations may approve a reduced crew rest of no less that 8 hours total ground time provided this time is confined between the hours of 8:00 p.m. and 8:00 a.m. local time. Approvals for reduced crew rest will be limited to one occurrence per crewmember during any 7-day period. Such approvals will be documented and maintained on file for a period of 12 months.

e. Time accrued by any flight crewmember traveling as passenger on an aircraft may not be credited to meet any of the crew rest requirements of this Chapter.

304. MAXIMUM FLIGHT TIMES

Flight crewmembers will not be scheduled, nor permitted to fly, if their total professional flying time exceeds the following flight hours:

Weekly	35 hours
Monthly	100 hours
Quarterly	300 hours
Yearly	1,000 hours

305. OTHER REQUIREMENTS OF FLIGHT CREWMEMBERS

Flight crewmembers will refrain from any activity, on or off duty, which could compromise the safety, integrity, or confidence in the operations of NASA's mission management aircraft, or which gives rise to an appearance of mental or emotional instability or a lack of sound judgement.

1. Use of Drugs

a. A mission management aircraft flight crewmember will not possess, use, or distribute any medication or drug which is designated an illegal or controlled dangerous substance under Federal or state law except as may be authorized by law.

b. A flight crewmember will take no medication within 24 hours before a flight other than a normal dosage of aspirin or related compounds.

c. Unless prescribed or approved by a NASA or FAA designated aviation medical examiner or by an armed forces flight surgeon, use of other medication by a crew member must be discontinued at least 24 hours before reporting for flight duty.

d. If continuing medication is necessary for a long-term disease, flight duty is prohibited unless the Federal Air Surgeon, FAA, specifically approves that medication at the time of issuance of a first class medical certificate.

2. Illness or Incapacitation. Flight crewmembers who become seriously ill, incapacitated, or hospitalized

for any mental or physical disorder will advise their immediate supervisor and consult with an aviation medical examiner or NASA flight surgeon before being assigned to flight duties.

3. Hazardous Hobbies. Interest pursued by flight crewmembers in their leisure time may present potential hazards to safe crewmember performance. For example, certain plastics, solvents, photographic chemicals, and insect poisons used in common hobbies may have toxic effects on persons exposed to them without the awareness of these effects by the individual involved. Flight crewmembers are urged to discuss all such possible hazards with their aviation medical examiner or flight surgeon.

4. Scuba Diving. No person will serve as a flight crewmember within 24 hours after using compressed air (or other gas) in a dive.

5. Immunization and Loss of Blood

   a. No persons will serve as a flight crewmember within 24 hours after being vaccinated or inoculated.

   b. Flight crewmembers will not serve as blood donors except under emergency conditions and subsequently should not perform flight duties for at least 72 hours.

   c. After accidental blood loss exceeding 1/2 pint, approval from a physician indicating blood levels are normal will be required before returning to flight duties.

6. Use of Alcohol. No person may act as a crewmember while under the influence of alcohol. Additionally, crewmembers will not consume any alcoholic beverage while on duty or during the 10-hour period prior to reporting for duty.

7. Extracurricular Employment

   a. Work of such an extent or nature as to interfere with efficient performance of flight crew duties is prohibited. Outside employment is subject to administrative approval in accordance with NHB 1900.1, "Standards of Conduct for NASA Employees."

b. Flight crewmembers may not engage in any outside commercial flight activities if that employment plus their regular duty compromise any duty or flight time limitation of this Chapter.

8. Distribution of Flight Time. Flight crewmembers should be scheduled so that flight time is equitably distributed to meet individual training and proficiency requirements.

CHAPTER 4 - FLIGHT OPERATIONS

400. GENERAL

NASA mission management aircraft will be operated in accordance with the procedures specified in Federal Aviation Regulation Part 91, Subparts A and B, and with the provisions of this Chapter, whichever is more restrictive. Procedures of the International Civil Aviation Organization (ICAO) will apply in lieu of FAR Part 91 on international flights.

1. Pilot Authority. The designated PIC is responsible for the safe conduct of the flight and is the final authority as to the operation of the aircraft. As the PIC, he/she may deviate from the provisions of this manual to the extent necessary; however, after the termination of the flight, the chief of aircraft operations will be informed of the extent and circumstances causing this deviation.

2. Dress Standards. Dress standards for flight crews will be locally designated by the chief of aircraft operations. Type and quantity of clothing should be appropriate to the enroute as well as to the terminal destination weather.

3. Hazardous Cargo. As NASA flight crew members are not normally trained in handling hazardous material, nor are mission management aircraft provisioned with protective clothing or equipment, hazardous material as defined in 49 CFR 171.8 will not be transported in NASA mission management aircraft. To assure hazardous material is not inadvertently loaded on mission management aircraft, all cargo to be shipped should be routed through the Field Installation's transportation office or, if enroute, cargo should normally only be accepted from a certified shipper or freight forwarding agency. Unaccompanied baggage will be treated as cargo.

4. Additional Flight Crewmember Duties. Flight crewmembers will not be assigned duties other than normal flight duties on any flight mission. Exceptions may be allowed on particular flights at the discretion of the chief of aircraft operations provided the additional duties do not interfere with crewmembers' opportunities for rest, postflight/ preflight routine, and concentrated flight planning during intermediate stops.

5. Aircraft Checklists. NASA mission management aircraft are equipped with approved standardized checklists and performance references which will be diligently used by all flight crewmembers. Mission management aircraft subpanels of the IAOP will review and revise these checklists as necessary. Checklists are divided into two broad categories:

   a. Normal Procedures Checklists. These checklists will be used for all appropriate ground and flight operations and will be accomplished using the challenge and response method.

   b. Emergency Procedures Checklists. These checklists are divided into critical and noncritical emergency procedures. Critical procedures are those that may have to be performed by memory without sufficient time for checklist reference, e.g., aborted takeoff. Noncritical emergency procedures are those that may allow review prior to the action, e.g., ditching or wheels-up landing, or may allow sufficient time for direct checklist reference, e.g., single generator failure. In all cases, when time permits, direct reference will be made to the specific checklist.

6. Sterile Cockpit Procedures. During all critical flight operations, cockpit activities will be limited to those involved with the direct operation of the aircraft. These activities exclude nonrelevant conversation, radio and telephone calls that are non-ATC related, and administrative paper work. For the purpose of this paragraph, critical flight operation includes all takeoffs and landings, climbs and descents, and during cruise flight below 5,000 ft. and at any time designated by the PIC.

7. Minimum Equipment Lists. Minimum equipment lists or required equipment lists will be available for each type mission management aircraft. These lists will be used by aircraft operations personnel in determining the minimum equipment necessary to conduct normal passenger operations.

401. PREDEPARTURE PROCEDURES

1. Crew Briefings. Before departure, the PIC will brief the crew on all essential information concerning the flight including the duties and responsibilities of each flight crewmember.

2. Passenger Considerations

a. Travel Authority. Only personnel authorized by NASA directives may be carried as passengers on mission management aircraft. If personnel arrive for a flight and they have not been previously manifested, the PIC will ascertain their authorization to travel from the aircraft's scheduling authority, the trip coordinator, or the senior NASA passenger.

b. Passenger Manifesting. All passengers will be manifested on NASA Form 1269, "Flight Itinerary and Passenger Manifest," or an authorized substitute form. Prior to departure, the PIC will certify the accuracy of the manifest and file a copy with a responsible ground agency such as a military, civil, or NASA operations office. If a responsible NASA official acting as a ground coordinator for the flight is aware of all changes to the manifest, the PIC is relieved of this requirement. The publication of specific local procedures is required to assure that there is always a readily available accurate list of personnel aboard NASA aircraft.

c. Passenger Loading. Normally, all engines and propellers will be completely stopped when loading and unloading passengers or cargo from mission management aircraft. In those rare instances when, in the determination of the PIC, extenuating circumstance require the loading or unloading of passengers or cargo with an engine running, the following minimum precautions will be followed:

(1) Only the engine on the opposite side of the aircraft from the loading door may be operating and will be operated at as low a power setting as practical.

(2) The aircraft will be parked so that passengers approaching or leaving the aircraft will not walk in front of, nor behind a rotating propeller nor in the vicinity of an operating turbo-jet engine.

(3) A flight crewmember will be positioned on the ground to assure passengers do not approach close to an operating engine.

d. Passenger Briefings. The PIC will ensure all passengers have been briefed on smoking, use of seat belts, location and operation of appropriate emergency and survival equipment, and operation of doors and exits. This information will be supplemented by printed passenger information cards. Tape recorded passenger briefings may be used provided the sound reproduction is of high quality and provided a crewmember is present in the cabin during the briefing to answer passenger questions.

3. Flight Planning

Thorough flight planning is essential to the safe and efficient conduct of mission management passenger flights. A flight plan will be filed for all flights. Passenger flights will be operated under instrument flight rules and, to the maximum extent possible, in controlled airspace; however, daylight flights of less than 100 nautical miles may be operated under visual flight rules if weather conditions permit. These flights must utilize radar advisory service to the maximum extent possible.

a. Fuel Planning. Considering weather forecasts and any known enroute delays, the minimum amount of useable fuel required at takeoff will be sufficient to:

(1) Complete the flight to the destination airport

(2) Fly from that airport to the alternate airport, if required.

(3) Fly after that for 1 additional hour using normal cruise consumption at 16,000 feet mean sea level.

b. Weather Planning. Prior to takeoff, the PIC will receive a thorough weather briefing concerning current weather and forecasts for the proposed route, destination, and alternate.

(1) Departure Weather. Normally weather minimums for takeoff will be not less than landing minimums appropriate for the aircraft equipment and for the airport facilities. However, if the urgency of the mission requires, as determined by the PIC,

a takeoff may be made when the weather is below landing minimums but not less than 1/4 miles visibility or runway visual range (RVR) 1600 feet and provided a suitable departure alternate is available within 100 nautical miles. The weather reported at the departure alternate must be at or above landing minimums and forecast to remain so for at least 2 hours after takeoff.

(2) Enroute Weather. Mission management aircraft will not file into areas of reported or forecast severe icing conditions. Operative airborne radar is required for any flight into areas where current weather reports or forecasts indicate that thunderstorms may reasonably be expected and flight under daylight visual meteorological conditions is not possible. Whenever possible, all flights will be planned to circumnavigate areas of thunderstorm activity.

(3) Destination Weather. Mission management aircraft may file for a destination that forecasts prevailing visibility equal to or greater than published landing minimums appropriate to the aircraft equipment, but not less than 1/2 mile or RVR 1800 feet for time of arrival. If the destination weather is reported and forecast to be less than 2000-foot ceiling or less than 3 miles visibility from 1 hour before until 1 hour after the estimated time of arrival (ETA), an alternate airport will be listed on the flight plan. Airport weather minimums will meet or exceed the requirements of FAR Part 91.

(4) New Aircraft Commanders. When the pilot has less than 100 hours PIC experience in the type (make and Model) aircraft being operated, the minimum descent altitude (MDA) or the decision height (DH) and visibility landing minimums are increased by 200 feet and 1/2 mile (or the RVR equivalent) for all instrument approaches conducted by that pilot. In no case may the landing minimums be less than 400-foot ceiling and 3/4-mile

visibility. Similarly, takeoffs will not be made if the airfield is below these adjusted landing minimums.

4. Preflight Inspections. Before each flight, the PIC will ensure that the aircraft is in an airworthy condition. Required inspections should be accomplished as soon as practical after reporting to operations so that minor discrepancies may be corrected before a delay is incurred.

   a. Aircraft Logs. Prior to activating any aircraft system, "NASA Aircraft Log," NASA Form 1257, and the "Mission Management Aircraft Delayed Discrepancy Form," NASA Form 1260, will be reviewed and evaluated. Prior to flight, the PIC will accept the aircraft by signing NASA Form 1257. DOD aircraft forms may be used as a substitute for the appropriate NASA forms.

   b. Aircraft Visual Inspection. The aircraft visual external and internal preflight inspections will be accomplished in accordance with the aircraft flight manual. At intermediate stops, as a minimum, an abbreviated walk around inspection will be conducted after each arrival and before each departure. A walk-around inspection is an external examination intended to detect those obvious discrepancies that may occur at any time to an aircraft, e.g., a bird strike, missing panels, or damage caused by ground servicing equipment.

   c. Flight Equipment. Navigation and radio equipment necessary for the flight will be given an operational check prior to departure. Current in-flight publications will be readily available and adequate for the mission.

   d. Special Equipment. Appropriate and sufficient emergency and survival equipment will be available and inspected before the flight. An oxygen mask and flashlight will be available at each crew station. For extended overwater operations, mission management aircraft will carry sufficient life rafts, individual floatation devices, and survival equipment for all personnel on board. Mission management aircraft operations panels will develop standard emergency equipment configuration, i.e., quantity, type, and location for each type aircraft.

e. Cold Weather Operations. Under no circumstances will takeoff be attempted with ice, snow, or frost adhering to the airfoils or other critical areas of the aircraft.

5. Aircraft Loading. The PIC will ensure that the aircraft is limited to the maximum gross weight, zero fuel weight, maximum landing weight, and the center of gravity limits specified in the appropriate aircraft flight manual.

a. Weight and Balance Data. A copy of the current weight and balance data will be maintained aboard each mission management aircraft. It will be used to determine that the weight and center of gravity will remain within limits for the duration of each flight.

b. Cargo and Passengers. When cargo and passengers are carried on the same flight, cargo will be stored in the baggage compartment or if this is not practical, cargo will be stored forward of passengers in the cabin. All cargo, baggage, or other equipment will be properly secured to prevent injury to passengers or damage to the cargo or aircraft. Personal equipment, such as briefcases and briefing materials, may be carried by passengers in the cabin provided the articles may be properly stored under passenger seats during takeoff and landing.

402. TAKEOFF AND DEPARTURE PROCEDURES

1. Operation of Controls. A designated NASA pilot, qualified as an aircraft commander, first pilot, or second pilot will be at controls of mission management aircraft at all times during flight.

a. Takeoffs and Landings. The PIC will occupy either the left or right seat during all takeoffs and landings. At the discretion of the PIC, a first pilot may perform takeoffs and landings when passengers are carried provided the PIC occupies the other seat.

b. Adverse Conditions. Under adverse conditions the PIC will personally control the aircraft and will make all takeoffs and landings from the left seat. Adverse conditions include, but are not limited to, severe icing, severe turbulence, low ceilings

and visibilities, marginal runway conditions, and aircraft emergencies.

2. Departure Briefing. Before takeoff, the PIC will ensure the crew is briefed on the procedures to be used during takeoff and climb to cruising altitude and instructions for returning to the airport if necessary. Other crewmembers will monitor the departure and assist the pilot flying. They will immediately report to the pilot any deviation from anticipated procedure.

   The pilot flying will periodically announce his/her progress and intentions throughout the departure. Mission management aircraft operations panels may develop standardized departure briefings if desire.

3. Use of Navigational Aids (NAVAIDS) and Electronic Equipment. All available navaids will be used from departure to landing. On departure, navaids will be set up to aid in a possible expedited emergency return as well as to aid in establishing the initial enroute course.

   a. Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR). If installed and operative, the CVR and FDR will be turned on during the entire flight.

   b. Ground Proximity Warning System (GPWS). The GPWS will be used on all flights. If the equipment tests satisfactorily prior to takeoff, it will be assumed any GPWS warning is valid unless the aircraft position can immediately and positively be verified by visual reference. Immediate and appropriate action will be taken to all valid GPWS warning calls.

   c. Landing Lights. Maximum use of landing lights is encouraged during all takeoffs and landings and when operating near airports or in high density traffic areas.

4. Outside Vigilance. The PIC is responsible for ensuring that, during visual conditions, at least one person maintains a lookout for conflicting traffic at all times. Unnecessary paperwork will not be accomplished in the cockpit during flight.

a. Use of Autopilot. To aid in outside vigilance during flight in visual conditions, maximum use of the flight director system coupled to the autopilot is encouraged. However, on takeoff the autopilot will not be engaged at less than 500 feet above the terrain.

b. Outside Observer. Use of any additional crewmembers to aid in outside vigilance is highly encouraged, particularly while operating in visual conditions in heavy traffic areas. Flight mechanics will normally remain at their duty station throughout the climb and descent. Their cabin duties will be considered secondary in importance during these times.

403. ENROUTE PROCEDURES

1. Crewmembers at Station. Both pilot and co-pilot must remain at the their duty station with seat belt fastened while the aircraft is taxiing, taking off, landing, and while enroute unless such absence is necessary for the performance of their duties or in connection with physiological needs.

2. Passenger Considerations. The PIC is responsible for the safety and comfort of the passengers and should keep the senior passenger or trip coordinator apprised of any significant deviations from the itinerary or schedule. In-flight delays and readily discernable abnormal conditions should be explained to the passengers.

   a. Safety Belts. The PIC will ensure that all passengers and crewmembers have safety belts securely fastened for taxiing, takeoffs, landings, and before entering an area of in-flight turbulence.

   b. Admission To The Flight Deck. Passengers will not be admitted to the flight deck during the taxi, takeoff, climb, descent, and landing phase of flight. However, at other times, at the discretion of the PIC, visits to the flight deck by NASA passengers should be encouraged.

3. In-Flight Meals. Food requiring cooking will not be prepared inflight aboard mission management aircraft. Food for passengers and crew normally will be purchased from a commercial, NASA, or military food

service facility. On board food service should be appropriate to the size of aircraft and the duration of flight. Food service on short flights should be discouraged.

4. Flight Progress. The PIC will ensure that the aircraft's progress is continually monitored. This includes the progressive following of the aircraft's positions, fuel consumption, and the updating of enroute, destination and alternate weather.

5. Minimum Fuel. The PIC will notify ATC of the aircraft "minimum fuel" status at any time the fuel supply has reached a quantity where, upon reaching destination, little or no delay can be accepted. In no case may this quantity be less than that specified in paragraph 406-3. A minimum fuel advisory does not imply to ATC a need for traffic priority. However, if fuel remaining indicates a need for traffic priority to ensure a safe landing, the PIC will formally declare an emergency due to low fuel and will report fuel remaining in minutes.

6. Emergency Procedures. When an emergency or in-flight difficulty arises, the PIC will complete the appropriate checklists and report the difficulty to the controlling ground agency. This report will include the nature and extent of the difficulty, intentions, type of assistance requested, and any other pertinent information. In the event of an engine failure or shut down, the PIC will land at the nearest suitable airport at which a safe landing can be made.

404. ARRIVAL, APPROACH, AND LANDING PROCEDURES

1. General. During instrument arrivals, all available navaids will be used. When available, precision approach guidance (Instrument Landing System or Precision Approach Radar) will be used for all night arrivals except training flights.

2. Weather Minimums. An approach will not be started unless the reported visibility is at or above approach minimums but in no case may the minimums be less than 1/2 mile visibility or RVR 1800 feet.

3. Destination Below Minimum. If the destination weather is marginal or below minimums, the PIC may proceed to a suitable alternate or may hold if the destination weather is forecast to improve and fuel for alternate

and reserve requirements will not be compromised. The weather at the alternate must be at or above alternate minimums and forecast to remain so until the new ETA plus 1 hour.

4. Approach Briefing. Before starting an approach, the pilot flying will brief the crew on the procedures to be followed during the approach and landing and in the event of a missed approach. The briefing will include a review of the procedure to be flown, including key altitudes and restrictions as well as specific crew duties during the approach and landing.

5. Approach Progress. The pilot making the approach will announce his/her progress and intentions periodically. The pilot not flying will monitor the approach and provide a continual cross-check of the navaids, instruments, air traffic control instructions, and approach procedures. Any deviations from the prescribed procedure will immediately be brought to the attention of the pilot flying. The pilot not flying will call out, "1000 feet above," and "100 feet above," all key altitudes as well as "minimums" upon reaching the appropriate MDA or DH. When the runway is in sight, the pilot not flying will state, "runway in sight." If the runway is not in sight when the aircraft reaches the missed approach point, the pilot not flying will state, "go around."

6. Use of Autopilot. Use of the autopilot during arrivals, descents, and approaches is encouraged particularly during visual flight conditions as an aid in collision avoidance. In order to prevent excessive loss of altitude in the event of an auto-pilot failure, the pilot directing the aircraft will maintain light control contact throughout the final portion of an automatic coupler approach. Full manual control will be assumed at or above published minimum altitude.

7. Cancelling Instrument Flight Plans. Normally, instrument flight plans will not be cancelled prior to landing.

405. POST FLIGHT PROCEDURES

1. Closing Flight Plan. On completion of the flight, the PIC will assure the flight plan is closed with the appropriate facility.

2. Aircraft Security. The PIC must take prudent measures to secure and protect the aircraft at enroute stops. These measures must preclude unnecessary exposure to weather, such as high winds and freezing precipitation, and must also provide a reasonable degree of security from such activities as vandalism, theft, or terrorism. At any time the aircraft is unattended by a member of the crew during enroute stops, it will be locked. At overnight stops, instructions for locating the crew should be left with the fixed base operator, base operations, or other airport authority.

3. Aircraft Flight Logs. The PIC will enter, or have entered, in the aircraft flight log each mechanical irregularity discovered during the flight. All unusual events (e.g., overweight or hard landings, lightning or bird strike, static discharge, and flight through hail or severe turbulence) will be recorded in the aircraft log.

406. SPECIFIC OPERATIONAL RESTRICTIONS

Appropriate aircraft flight manual data will be utilized to assure adequate takeoff, climb, approach, and landing performance is available for the actual conditions to be encountered. However, in recognition of the fact that flight manual data are determined under ideal conditions using highly skilled factory test pilots, the following additional restrictions are established to assure a prudent level of safety during routine line operations.

1. Minimum Runway Length

	Runway
King Air B200	3500 ft.
G-I	4000 ft.
G-III	6000 ft.

2. Wind Restrictions. For normal operations, airfields will be considered below minimums for takeoff and landing when winds, including gusts, are greater than established below.

	Maximum Wind	Tailwind Component*	Crosswind Component
King Air B200	45 kts	10 kts	20 kts
G-I	45 kts	10 kts	25 kts
G-III	40 kts	10 kts	20 kts

*On wet runways, tailwind components are limited to one-half of that listed above.

3. Minimum Fuel For Landing. Minimum fuel for landing is established in recognition of three factors: fuel required to execute an unanticipated go-around and traffic pattern; fuel required for landing, rollout, and taxi in; and an allowance for fuel quantity measuring system error. All flights will be planned so as to have no less than the following minimum indicated fuel available at touchdown on the final landing.

King Air B200	400 pounds
G-I	1000 pounds
G-III	2500 pounds

CHAPTER 5 - MAINTENANCE AND INSPECTION PROGRAM

500. GENERAL

This Chapter establishes a maintenance and inspection program to standardize methods and procedures for the total mission management aircraft maintenance effort in order to ensure safe operation of the aircraft and effective utilization of human resources and facilities.

501. BASIC PROGRAM STRUCTURE

The framework for the mission management aircraft maintenance and inspection program is established by:

1. Separation of maintenance tasks and functions into the following levels:

   a. Overhauls or major modifications.

   b. Phase or calendar inspections.

   c. Operational/line maintenance.

2. And by the application of the following inspection activities:

   a. Continuous airworthiness inspection program.

   b. Hourly inspections.

   c. Preflight/postflight inspections.

   d. Special inspections.

   e. Periodic reviews of the maintenance/inspection program.

502. MAINTENANCE LEVELS

The three functional levels of maintenance are further defined as follows:

1. Overhaul/Major Modification. Maintenance that must be accomplished at an FAA-certified industrial type facility. This level encompasses major repair and alterations, assemblies, and parts.

Accomplishment. Overhaul/major maintenance will be accomplished by the manufacturer or an FAA-approved overhaul facility.

2. Phase or Calendar Inspections. Maintenance and repair may be performed by a properly certificated and approved aircraft repair station or in-house facility. This level includes routine upkeep inspections, service changes, functional checks, calibration, minor repair, and modifications.

   Accomplishment. Phase or calendar inspection level maintenance will normally be accomplished in-house by a qualified facility or by an FAA-approved aircraft repair facility.

3. Operational/Line and Daily Maintenance. Routine preventive maintenance may be performed with the aid of simple hand tools. This level includes servicing, preflight and postflight inspections, ground tests, troubleshooting, correction of minor discrepancies, and compliance with applicable instructions for adjustment of parts which do not require removal of major assemblies or subassemblies.

   Accomplishment. Operational/line and daily maintenance will be accomplished in-house by qualified personnel or by an FAA-approved maintenance activity.

503. POSITIONS

Positions in the maintenance and inspection program are:

1. Chief of Aircraft Maintenance.

2. Supervisor of Quality Assurance.

3. Supervisor, Aircraft Mechanic.

4. Flight Mechanic.

5. Quality Assurance Inspector.

6. Aircraft Mechanic.

The positions described above are established as guidelines. Deviations are permitted to fit particular organizational structures. For example, in small organizations, individuals may be assigned multiple functions.

504. PERSONNEL QUALIFICATIONS AND TRAINING

1. Qualification and training of all personnel associated with the maintenance of mission management aircraft is the responsibility of the Field Installation. Their qualifications and experience, as a minimum, will meet the requirements set forth in FAR Part 65. The chief of aircraft maintenance, supervisor of quality assurance, and avionics/maintenance supervisors as a standard will be highly qualified, and excel in the level of experience and background in transport aircraft and particularly the types of aircraft under their supervision.

2. All personnel responsible for maintaining and operating mission management aircraft will be given every opportunity to develop and maintain the high degree of professional skill and efficiency required by NASA. Where formal aircraft, engine, components, management, and technical schools are available, these personnel, as appropriate, will be provided with:

   a. Initial training.

   b. Refresher training 12-18 months after initial training. The chief of aircraft maintenance will determine those personnel and those training programs for which refresher training applies.

   c. Recurrent training as recommended by the Intercenter Aircraft Operations Panel and approved by NASA Headquarters.

3. Training folders will be maintained for all maintenance personnel, indicating the date, amount, and type of training received as well as a list of those maintenance functions for which qualified.

505. STANDARDS

Performance and equipment standards will meet the requirements of FAR Part 43, as a minimum. Field Installation Directors will ensure that maintenance performed on mission management aircraft is of the highest possible standards.

1. Methods and Techniques. The guidance, methods, techniques, and practices contained in the FAR Part 43, and applicable aircraft manufacturers or military manuals will constitute acceptable minimums.

2. Airworthiness. Each Field Installation is responsible for compliance with recognized airworthiness standards for assigned aircraft, engines and associated components. Airworthiness certificates and an FAA-approved inspection program as required by FAR Part 91, will be maintained on all mission management aircraft.

3. Assignment of Maintenance Tasks. Only those persons specifically trained and designated as NASA mission management aircraft maintenance crew, or those authorized by component authority will be permitted to perform maintenance on mission management aircraft.

4. Equipment. All tools and equipment utilized to maintain mission management aircraft will meet aviation standards and be specifically designed for aircraft maintenance and the specific operation at hand. All tools and equipment will be maintained in a condition that permits safe and accurate workmanship. Test apparatus, including avionics and electrical equipment, torque wrenches, pressure instruments, and gauges, employed in maintaining mission management aircraft will be calibrated against an established value acceptable to the industry. Each piece of test equipment will be calibrated at intervals established by the manufacturer, or in accordance with accepted industry practices or by NASA standards. Calibration records will be maintained and the date calibration is next due will be attached to the unit.

5. Facilities. NASA Installations responsible for operation and maintenance of mission management aircraft, will provide adequate facilities, including adequate hangar space, for the maintenance and general upkeep of assigned aircraft.

The hangar will:

a. Be of such size and type to accommodate safe docking of the aircraft and provide safe and adequate working conditions.

b. Provide space for the safe movement of maintenance equipment; i.e., extension work stands, hydraulic test stands, and cranes around the aircraft while docked.

c. Be equipped with appropriate electrical power, lighting, compressed air, water facilities, fire

warning-extinguishing system, and an adequate climatic system under which personnel may safely accomplish the required maintenance tasks.

506. GENERAL MAINTENANCE AND INSPECTION PRACTICES

1. Calendar Inspection Schedule

a. NASA Headquarters will publish an annual aircraft (calendar) maintenance schedule. The schedule will be specific with respect to the dates aircraft will not be available because of scheduled maintenance. The schedule will be distributed to management personnel responsible for scheduling the aircraft. Maintenance schedules will be coordinated between Centers in order to avoid having several aircraft in scheduled maintenance simultaneously.

b. Established maintenance and inspection schedules will not be changed to meet routine travel requirements. Inspection schedules, except daily and preflight, may be adjusted in order to meet urgent Agency requirements, provided:

(1) Safety is not compromised.

(2) The adjustment does not exceed 7 days of the programmed interval (calendar time).

(3) The adjustment is not allowed to become accumulative and the anniversary dates of subsequent inspections are met.

2. Modifications Resulting from Airworthiness Directives, Service Changes, and Bulletins. Aircraft modifications will be accomplished as follows:

a. Safety of flight items will be accomplished prior to further flight.

b. Airworthiness directives will normally be accomplished as soon as practicable after receipt of directive, preferably during the next major inspection after receipt, unless earlier accomplishment is required by the airworthiness directives.

c. Mandatory aircraft, engine, and component service changes and bulletins will normally be accomplished during the next major inspection or

overhaul after receipt, unless earlier accomplishment is required by the directives.

d. Optional aircraft service changes and bulletins will be reviewed, prior to implementation, by the appropriate maintenance subpanel for the purpose of standardization of the mission management aircraft.

3. Time Change Items. Replacement of components and accessories required for reason of high time will be accomplished during a scheduled inspection period. Except for life limited items, a grace period of 10 percent may be applied to the time accrued on such items except when manufacturer specifically prohibits such extensions.

4. Minor Discrepancies. Correction of discrepancies, which do not affect safety of flight or the successful accomplishment of the mission, may be delayed until the mission is completed or until the next scheduled inspection. Correction of discrepancies will not be delayed beyond the next scheduled inspection unless parts are unavailable or the chief of aircraft operations approves such action. These discrepancies must be annotated on the Delayed Discrepancy Form (NASA Form 1260 or equivalent) which will be maintained as an integral part of the aircraft flight log.

5. Grounding the Aircraft. The chief of aircraft operations is responsible for and will establish guidelines governing grounding the aircraft for reasons other than scheduled inspection periods. Such instructions will broadly establish:

a. Conditions warranting grounding;

b. Authority for grounding; and

c. Reporting procedures.

6. Return of Aircraft to Service. Grounded mission management aircraft will not be returned to operational status after any maintenance, alternation, or changes to airframes, engine(s), propeller(s), and associated components, until:

a. All work has been inspected by assigned quality assurance personnel for completeness, accuracy, approved parts, and hardware.

b. Appropriate functional checks and/or tests for necessary adjustments and system integrity have been accomplished.

c. All aircraft records and applicable maintenance/inspection forms are completed and authenticated by designated maintenance and quality assurance personnel.

7. Functional Test Flight (FTF). The chief of aircraft operations in coordination with the chief of aircraft maintenance is responsible for establishing a policy governing the conduct of FTF's and determining the need for a FTF on a particular aircraft. An FTF will be conducted after maintenance work has been accomplished on any part(s) of an aircraft that may adversely affect the aircraft flight characteristics and after each phase or calendar inspection. FTF's will be conducted by the best qualified flight crews available under appropriate weather conditions and without passengers or cargo on board.

8. Interruption of Maintenance

a. Maintenance tasks involving disassembly of the airframe, engines, propellers, or major components will not be interrupted prior to completion, except in unusual circumstances.

b. The chief of aircraft maintenance will institute procedures that ensure job continuity when a particular job is interrupted or is assumed by other personnel.

9. Shift Changes. To preclude the possibility of maintenance errors through faulty communications during shift changes, the chief of aircraft maintenance will establish methods and procedures which ensure that:

a. An accurate account of the work progress is passed on to the on-coming shift.

b. All work completed is properly documented and authenticated by designated supervisory and quality assurance personnel.

10. Aircraft Weighing. Aircraft weight and balance data will be verified by actual weighing of the aircraft and recomputation of the center of gravity at least every 3 calendar years.

507. SCHEDULED INSPECTIONS AND PERIODIC MAINTENANCE SYSTEM

The maintenance and inspection procedures set forth in this manual are established to ensure that the material condition and readiness of mission management aircraft is commensurate with the NASA mission.

DEFINITION	PROCEDURES
1. Calendar Inspection	
The calendar inspection is a thorough searching examination of the aircraft and is to be conducted at predetermined calendar dates. It consists of minimum requirements set forth in a deck of maintenance requirements cards (MRC), plus additional items scheduled for compliance at less frequent intervals.	Aircraft will be inspected in accordance with the approved aircraft inspection program. Inspections will be scheduled in multiples of calendar days, computed from induction date to induction date, irrespective of days consumed performing the individual inspection. Inspection will be programmed to ensure that the scheduled maintenance and inspection workload during any one specified period is optimized in consonance with like preceding and subsequent periods. Once this schedule is initiated, it must be maintained. To meet unusual or special requirements, due to local climatic or operational conditions, the chief of aircraft maintenance may increase the depth of any calendar inspection; however, the inspection will be logged as the type which would be used in accordance with the programmed sequence. Continuing additional effort will be incorporated into the deck of maintenance requirement cards. The chief

	of aircraft operations or chief of aircraft maintenance may also require the accomplishment of a special inspection to the depth considered appropriate whenever excessive utilization during the authorized calendar inspection interval is considered to have compromised or impaired the reliability or integrity of the aircraft.
2. Hourly Inspections	
Inspections performed upon accumulation of a specific number of operating hours to satisfy requirements peculiar to a component, system, or maintenance program.	Within the framework of the maintenance program established herein, hourly inspections will be accomplished each 50 hours of operating time in accordance with published instructions. Accomplishment of inspections will be noted and authenticated in the appropriate records and aircraft logs.
3. Special Inspections	
Inspections required by airworthiness directives, technical directives, reports of hard landings, severe turbulence, and lightning strikes.	Accomplished in accordance with procedures established by the manufacturer, technical directive, or in accordance with procedures established by authority having overall responsibility for maintenance and inspection.
4. Postflight Inspection Operational/Line Level	
The postflight inspection is a combination of requirements to verify the satisfactory functioning of equipment, plus a search for defects apparent as a result of the previous flight; correction of minor	The postflight inspection will be accomplished after the last flight of the day. (1) Conduct inspection in accordance with the postflight inspection guide. (2) If no discrepancies are

discrepancies, such as chaffing and leaks, to preclude progression to a state that would require an inspection at intervals more frequent than calendar intervals.	found, complete inspection form and turn it into the maintenance office. (3) Sign aircraft flight log in space provided. (4) Take corrective action immediately for any major discrepancies noted and notify, as appropriate, the chief of aircraft maintenance or the pilot. (Enter in the aircraft log a brief description of the discrepancy and corrective action taken.)

5. Preflight Inspection Operational/Line Level

The preflight inspection consists of checking the aircraft for flight preparedness by performing visual examination and operational tests to discover defects and malfunctions which, if not corrected, could adversely affect safety, or mission accomplishment, including a check to determine if the aircraft has been properly serviced for the next flight.	The maintenance preflight inspection will be accomplished prior to the first flight of the day and following any period the aircraft is left unattended in an area where it is possible for unauthorized personnel to climb on or damage the aircraft, or a crew change is effected.

508. SCHEDULED INSPECTION PROCEDURES AND RESPONSIBILITIES

Scheduled inspection procedures and responsibilities are as follows:

1. Preinspection Critique. Prior to each major inspection or alteration, the chief of aircraft maintenance will ensure that the supervisors and crew leaders are thoroughly briefed and that a review of the maintenance history is accomplished. The review will include the following:

   a. Delayed discrepancies.

   b. Manufacturer's bulletins and letters.

   c. Airworthiness directives.

d. Forms and reports associated with the applicable maintenance system.

e. All or that portion of the maintenance guide applicable to the specific inspection, alteration, or change.

f. Sufficient parts are on hand to complete the inspection with the allotted time.

2. In Progress. The chief of aircraft maintenance and chief of quality assurance will establish procedures to ensure that work in progress is monitored on a continuing or sampling basis; that all jobs are properly inspected by the designated quality assurance personnel, and that records of all work are complete and properly authenticated.

3. Post Inspection. After any work where engine or component controls have been adjusted, changed, or disconnected for any reason, an engine ground test/exercise of all major and minor aircraft engine or component controls will be accomplished before the aircraft is returned to service. Prior to such testing or operation, all controls will be exercised and visually checked for security, proper movement, and displacement parameters.

509. CORROSION CONTROL PROGRAM

A comprehensive corrosion control program will be established by each installation operating mission management aircraft. This program will be designed to prevent, detect, and correct aircraft deterioration as a result of corrosion. Program should include requirements for aircraft hangaring, periodic washing, and paint repair. Mission management aircraft will normally be scheduled for complete repainting and corrosion inspection every 5 years but not to exceed each 7 years.

510. OIL ANALYSIS PROGRAM

Each Installation should have an established spectrometric oil analysis program (SOAP). An analysis of engines, transmissions, gearboxes, and other suitable oil lubricated components installed on mission management aircraft will be conducted in accordance with the manufacturer's criteria and recommended procedures.

511. CONTRACT ARRANGEMENTS

1. Arrangements made with another activity to perform maintenance or repairs do not relieve the operating activity of the responsibility for proper maintenance and inspection of the aircraft.

2. Disassembly, Inspection, and Repair Reports (DIR) will be obtained from Agencies overhauling or repairing mission management aircraft, major components, or parts. A statement similar to the following will be affixed to the Installation purchase request: "Provide a written disassembly, inspection, and repair (DIR) report immediately to: (the originating installation). The written DIR will be preceded by a telephone report when safety of flight is involved."

3. To the extent practicable, a NASA representative will conduct periodic reviews during major component overhauls at contract facilities.

512. MISSION MANAGEMENT AIRCRAFT MAINTENANCE PANELS

The Mission Management Aircraft Maintenance Panels will function as subpanels to the NASA Intercenter Aircraft Operations Panel.

1. Composition. Maintenance panels normally will be composed of the chiefs of aircraft maintenance of each Field Installation engaged in the operation of mission management aircraft. In addition, it is recommended that each Installation include, as a nonvoting member, the quality assurance and avionics supervisors when appropriate. A representative from NASA Headquarters will act as permanent executive secretary. The designation of chairperson will be rotated periodically.

2. Responsibility. Maintenance panels are responsible for recommending, reviewing, and standardizing, where feasible, all aspects of the maintenance function associated with the operation of mission management aircraft. The goal is to provide the highest standards of efficiency and safety.

3. Functions. Maintenance Panels will:

   a. Meet periodically at the direction of the Chairperson, NASA Intercenter Aircraft Operations Panel, but not less than annually.

b. Review current maintenance policies, procedures, facilities, directives, and develop recommended changes as necessary.

c. Conduct airworthiness evaluations of all proposed modifications or new equipment additions to mission management aircraft.

d. Submit written minutes of all meetings to the Chairperson, NASA Intercenter Aircraft Operations Panel, and to NASA Headquarters. Headquarters approved recommendations will be considered directive in nature.

4. Authority. The Chairperson of each Mission Management Maintenance Panel will submit the panel's recommendations to the Aircraft Management Office for appropriate action. Approval/disapproval of these recommendations will be noted in the minutes which will be disseminated to each panel member and to each Installation's chief of aircraft operations. The chief of each aircraft operations operating mission management aircraft may submit material to the Chairperson, Aircraft Maintenance Panel, for consideration.

CHAPTER 6 - AIRCRAFT QUALITY ASSURANCE PROGRAM

600. PROGRAM

A comprehensive aircraft quality assurance program will be established at each Field Installation responsible for the maintenance of mission management aircraft.

601. CONCEPT

1. The concept of aircraft quality assurance:

   a. Embraces all events from the start of a maintenance operation to its completion.

   b. Is the basis for ensuring that aircraft are maintained in accordance with the highest standards.

   c. Requires the systematic verification of compliance with requirements beginning with the ordering of a component or material, and continuing through receiving, fabrication, assembly, rework, repair, modification, testing, final inspection, and completion of records.

2. Strict adherence to quality assurance procedures will be employed in all phases of mission management aircraft maintenance in order to:

   a. Improve quality and uniformity of the total maintenance effort.

   b. Improve work environment, tools, and equipment.

   c. Establish realistic material and equipment requirements.

   d. Improve training, work habits, and procedures for maintenance personnel.

   e. Enhance the safety of the overall operation of mission management aircraft.

602. PROCEDURES AND STANDARDS

1. The quality assurance for aircraft maintenance will be performed in accordance with the procedures and standards set forth in this Chapter and applicable maintenance publications.

2. The quality assurance organizational unit will establish procedures for the quality assurance program, including inspections, tests, functional checks, and application of NASA quality assurance standards, as it relates to aircraft and aircraft systems, components, equipment, material during manufacture, procurement, assembly, and operational phases. These procedures and inspections will encompass in-house as well as contractor workmanship and the resulting maintenance on aircraft, equipment, systems, and materials.

603. METHODS AND TECHNIQUES

The quality assurance supervisor will establish inspection methods and procedures to assure the efficient operation of the aircraft quality assurance program. He/she will also ensure a safe operation by:

1. Making final inspection of repairs, servicing, and maintenance of aircraft.

2. Interpreting and analyzing charts for maintenance and inspection personnel and instructing maintenance personnel in any new inspection or statistical procedure.

3. Monitoring contracts and the contractors involved in rework, modifications, and overhaul of aircraft or components for workmanship, quality, and reliability.

4. Ensuring that procedures and materials satisfy NASA standards.

5. Making decisions concerning problems which require various adaptations in determining solutions for which there are no existing procedures, and in all cases assuring that airworthiness is not compromised.

6. Studying, investigating, and evaluating all malfunctions or deficiencies in aircraft systems and components to determine cause of malfunctions.

7. Initiating unsatisfactory reports as required and applying positive action to correct the condition which caused the unsatisfactory reports.

8. Reviewing all incoming technical publications and directives to determine their application and ensure appropriate action is taken when and where applicable.

9. Assuring that continuous on-the-job inspection of all maintenance tasks and functions is provided.

10. Assuring that adequate records and data on discrepancies are maintained to establish the trends of maintenance.

11. Assuring that established procedures are observed by mechanics in conducting tests and repairs, including conformance to workmanship requirements and criteria contained in NASA directives and aircraft handbooks.

12. Assuring that work which is found to be unsatisfactory is immediately corrected, reinspected, and action completed to prevent recurrence.

13. Assuring that all approved modifications are incorporated in the aircraft, aircraft components, and support equipment.

14. Assuring that appropriate inspection equipment such as lights, mirrors, magnifying glasses, dye penetrant kits, and pressure gauges are available, calibrated, and properly used when necessary.

15. Assuring that all work guides, checkoff lists, check sheets, and maintenance requirement cards, used to define or control maintenance operations, are complete and up-to-date.

16. Assuring that all equipment and parts received for use are inspected for acceptable material condition.

17. Assuring that inspections of maintenance and precision measuring equipment is performed to ensure compliance with calibration and safety instructions.

18. Assuring that an operational check is conducted on all systems, components, and accessories after any maintenance and/or repair has been accomplished.

19. Assuring that technical inspections of all maintenance equipment is conducted.

604. PERSONNEL

1. General. Local procedures will be established to ensure that only personnel possessing the requisite

qualifications and experience are designated to inspect or supervise maintenance on NASA mission management aircraft.

2. Qualifications. Quality assurance personnel as a minimum must possess the necessary knowledge, experience, and skill requirements for aircraft inspectors as set forth in FAR Part 65.

3. Designation of Quality Assurance Inspectors. Quality assurance inspectors will be designated in writing by the chief of aircraft operations. These personnel will normally be selected by the Quality Assurance Supervisor. The designation will contain as a minimum:

   a. Inspector's name and rating.

   b. Basic inspection responsibilities and authority.

605. QUALITY STATUS STAMPS

1. The quality status of equipment, components, materials, and documents will be identified by use of the following NASA quality status stamps or by signature and status.

   a. Conformance stamp or signature and status.

   b. Nonconformance stamp or signature and status.

   c. Void stamp or signature and status.

2. Where special indications are required other than those indicated above, NASA Installations may use stamps of their own design. Control, application, and use of quality status stamps and special Installation stamps will be in accordance with written instructions.

606. TREND ANALYSIS

The quality assurance section will conduct periodic reviews of aircraft historical data to determine any unfavorable trends; e.g., recurring discrepancies and frequent parts replacement. Quality assurance information will be collected from inspections, work orders, flight logs, engine run sheets, delayed discrepancy lists, oil analysis reports, and computerized reliability and trend reports. From these sources, data are compiled which may provide:

1. A trend of the quality of work.

2. Detection of discrepancies, human and material deficiencies, and the basis of corrective action.

607. INFORMATION CROSS-FEED

The quality assurance supervisor will be responsible for the dissemination of relevant maintenance information concerning malfunctions, material defects, and mishaps. In addition to Headquarters and Center directed reporting procedures, maximum use will be made of the FAA Malfunction or Defect Report System (FAA Form 8010-4) and any failure report system conducted by the aircraft or engine manufacturer. Information copies of these reports will be provided to the quality assurance supervisor at other NASA Centers operating similar equipment and to the Aircraft Management Office. For those routine occurrences that could provide "lessons learned" to other NASA operators, telephonic dissemination is strongly encouraged.

608. RECOMMENDATIONS

On the basis of knowledge derived from the summation of all data collected, the quality assurance supervisor will make recommendations to the chief of aircraft operations concerning ways and means of increasing maintenance effectiveness.

609. TECHNICAL PUBLICATIONS

The quality assurance supervisor will maintain all applicable technical publications and ensure that pertinent information is properly disseminated. A routine system will be established which will:

1. Provide a method of tracing the flow of material and determining that appropriate action has been completed.

2. Ensure that all aircraft directives, manufacturer's letters, and bulletins are routed and receipted for by those supervisors and inspectors who are responsible for the maintenance of the aircraft or related equipment.

3. Ensure that all directives and instructions concerning safety of flight are hand delivered and receipted for by the personnel responsible for initiating corrective action.

610. TECHNICAL LIBRARY

1. The quality assurance supervisor will ensure that a current library of all technical publications pertinent to assigned aircraft, support equipment, and general maintenance requirements are maintained, publications are current (updated as required), change status verified annually, and that the following publications, as applicable, are readily accessible to maintenance personnel.

    a. Handbook of Maintenance Instructions.

    b. Handbook of Inspection.

    c. Parts Manual.

    d. Component and Accessories Manuals.

    e. Overhaul and Repair Manual.

    f. Structural Repair Manual.

    g. Manufacturer's Service Letters.

    h. Manufacturer's Newsletters and Operational Summaries.

    i. Manufacturer's Engineering Bulletins.

    j. Service Changes.

    k. Wiring Diagrams.

    l. Aircraft Flight Manual.

2. Requirements for additional technical publications not on file in the technical library will be requisitioned through the quality assurance supervisor. Material that is ordered directly from the source by a requestor other than the library will have this material sent through the library for inclusion into the indexing and distribution system. Material retained in the library to satisfy special requests will be revised and updated until notified by the requestor that the requirement no longer exists and the material can be disposed. Periodic review will be conducted to verify existing requirements.

611. AIRCRAFT MAINTENANCE RECORDS

1. Objective. The quality assurance supervisor will maintain a forms and records system for each aircraft, associated equipment, and as required for aerospace ground equipment, support articles, and specialized items in order to provide a means to:

   a. Identify and control the total work effort scheduled and nonscheduled.

   b. Verify the satisfactory performance of such work effort.

   c. Report operational information, inspection writeups, engineering data, maintenance history, and other items of a similar nature.

   d. Establish a common operational information source, in immediate proximity to the aircraft affected and readily accessible to all personnel concerned, and oriented to recorded rather than verbal inputs and data.

   e. Retain operational records encompassing all phases of aircraft maintenance and operation in order to identify quality trends and to note maintenance difficulties, recurring discrepancies, frequent parts replacement, and other significant factors.

   f. In lieu of the above, establish a computerized maintenance system that lists all inspections, component changes, major repairs, Airworthiness Directives notes, and service bulletins. Assure adequate safeguards are established to prevent loss of nonreplaceable data.

2. Requirement. The quality assurance supervisor will ensure that a record of all maintenance, repair, alternation, or modification of any airframe, power plant, propeller, or appliance is recorded in the applicable section of the permanent aircraft, engine, and propeller log. These records will, as a minimum, contain:

   a. Complete description of work accomplished.

   b. Date of completion of work performed.

c. Name of the individual who performed the work, location of repair station, and name of manufacturer of the aircraft.

d. Signature of person authorized to authenticate the entry.

e. FAA repair station stamp and number, as appropriate.

612. RECORD OF WORK PERFORMED

A record of all scheduled and nonscheduled work performed will be maintained. Such records will contain, as a minimum, the following information:

1. The aircraft serial number, model, and type.

2. Items inspected.

3. Nature of repair.

4. Mechanic's name.

5. Quality Assurance Inspector's name.

613. RETENTION OF RECORDS

Maintenance activities will:

1. Keep all records of major structural repairs and major alternations until the aircraft is sold, transferred, or retired.

2. Keep a record of all routine maintenance for 1 year.

3. Maintain the records of the last complete overhaul cycle for each aircraft, airframe, aircraft engine, propeller, appliance, or component thereof, until aircraft disposition.

4. Keep all records of the results of X-rays and other special tests.

5. Retain flight data recorder tapes for a minimum of 2 years.

614. FORMS AND RECORDS

1. Required Forms. All NASA forms may be obtained through the normal NASA forms distribution system. The following forms or revisions thereto will be used in the operations and maintenance of mission management aircraft as required:

   a. NASA Aircraft Log, NASA Form 1257.

   b. Mission Management Postflight/Preflight Inspection (G-159), NASA Form 1258.

   c. Mission Management Aircraft Daily/Preflight Inspection, King Air B200, GSFC/WFF Form 116.

   d. Mission Management Aircraft Delayed Discrepancy Form, NASA Form 1260.

   e. G-159 Inflight Record of Engine System Performance, NASA Form 1438.

   f. Flight Itinerary and Passenger Manifest, NASA Form 1269.

2. Additional Forms For Recording Work Accomplished. Additional forms may be developed as the requirement arises; however, such forms other than for local use, must be approved by NASA Headquarters through the Aircraft Management Office.

615. CALIBRATION-TESTING INSTRUMENTS-GAUGES

The quality assurance supervisor will establish a program and records to provide for the timely recurring calibration-testing tools, gauges, and instruments, and mark such equipment with next calibration-test due date.

CHAPTER 7 - GROUND HANDLING AND SERVICING

700. APPLICABILITY

Ground-handling and servicing functions will be performed in accordance with procedures and standards established by this Chapter and all other applicable rules and regulations.

701. QUALIFICATIONS

Each maintenance activity responsible for NASA mission management aircraft will ensure that personnel assigned ground-handling and servicing duties are fully qualified and familiar with general and local safety instructions.

1. Such personnel must be trained and authorized to operate a tow vehicle on the ramp and flight line at bases where towing is conducted.

2. Training folders will be maintained for all personnel authorized to perform ground-handling and servicing duties. The record will indicate the date and amount of training received as well as the specific tasks for which the individual has been qualified.

3. Ground-support personnel will demonstrate to the satisfaction of the chief of aircraft maintenance the necessary knowledge, skill, and judgment to operate ground-support equipment in proximity of aircraft.

702. EQUIPMENT

1. Design. Generally, all ground-support equipment used in support of NASA mission management aircraft will be that which is specifically designed for aircraft ground support. Equipment that does not meet this standard must be approved for flight line use by the chief of aircraft operations and by the Installation's safety officer.

2. Operating Instructions

   a. Ground Power Equipment. The instructions and safety regulations regarding operation of ground-power support equipment will be posted in a conspicuous position, preferably near the operator's panel or controls.

b. Hydraulic Equipment. In addition to operations and safety instructions, the type and grade of fluid used for all hydraulic equipment will be clearly stenciled adjacent to the fluid filler cap.

c. Maintenance of Equipment. A mechanic will be assigned to monitor the mechanical condition of ground equipment to ensure that it is serviceable.

703. TOWING OPERATIONS

1. Aircraft may only be towed by a person trained, authorized, and designated in writing by the chief of aircraft maintenance.

2. The tug operator is responsible for ensuring that the scissors or lock on the aircraft steering unit is disconnected, if applicable, prior to towing. A qualified person will occupy the cockpit of the towed aircraft. That person will not release or reset the brakes until wheel chocks are removed or replaced as necessary and an order has been given by the tug operator or other person responsible for moving the aircraft. Each verbal order must be clearly acknowledged. Each person involved in the movement of the aircraft being towed bears a responsibility to take action or order any action necessary to prevent an accident.

3. Maximum towing speed is 5 miles per hour.

4. When an aircraft is towed through a congested area and/or when visibility is restricted, wing walkers will be utilized to assure adequate obstruction clearance as required for safe movement of the aircraft.

704. GROUND MAINTENANCE OPERATION

1. Authorization. Aircraft taxiing and engine runs for maintenance purposes will be conducted only by those mechanics authorized by the chief of aircraft operations. The chief of aircraft maintenance will maintain a current list of personnel trained and authorized to taxi and/or conduct engine runs.

2. Minimum Qualification Requirements. Personnel authorized to taxi and/or perform engine ground runs must have demonstrated to the satisfaction of the

chief of aircraft operations necessary experience and knowledge to perform these functions in accordance with established procedures.

3. Safety Requirement. During each ground run of the engines, the following safeguards will be observed.

   a. A fire guard will be stationed near the engine and in plain view of the operator at all times when the engines are being started. The fire guard will man a fire extinguisher of adequate capacity.

   b. Ground personnel will wear approved ear protectors at all times when the operation of a turbine engine is involved.

   c. Auxiliary ground power supply will be used for engine starts, when available.

   d. All maintenance personnel will use standard hand signals during all ground-handling operations.

   e. Two qualified personnel (pilots or mechanics) will be in the cockpit during all ground engine runs.

705. AIRCRAFT DEPARTURES AND ARRIVALS

1. Departures

   a. Each aircraft will normally be ready at least 1 hour before scheduled departure time and will be in place on the ramp in departure position unless weather conditions dictate that it remain in the hangar. In this event, it will be in the number one position in the hangar.

   b. The preflight inspection form will be completed and the aircraft flight log signed off prior to departure.

2. Arrivals. Aircraft arriving at the home station will normally be met by members of the maintenance crew to assist in:

   a. Parking the aircraft, including providing a marshaler and wing walkers in congested areas.

   b. Disembarking passengers and unloading baggage.

   c. Inspecting and servicing the aircraft for the next flight.

706. SERVICING

1. Posting of Servicing Data

a. The applicable manufacturer's maintenance instructions contain specific information as to quantity, type, and grade of fuel, oil, hydraulic fluid, and water/methanol. A copy of the applicable manufacturer's service manual or type-written excerpts from the servicing section of this Chapter will be kept aboard the aircraft for ready reference.

b. Specifications for fuel, oil, and water methanol used in the various mechanisms will be conspicuously stenciled in legible print near the filler caps.

2. Fuel

a. General. All fueling and defueling of mission management aircraft will be accomplished or supervised by a responsible NASA representative who will ensure that all established safety regulations relative to handling of aviation fuels are strictly observed and that the type and fuel quantity prescribed by the aircraft commander is supplied.

b. Procedures

(1) Passengers may remain on board the aircraft (unless fueling facility regulations prohibit this action) provided a crewmember remains on board to ensure that passengers do not smoke and remain seated.

(2) Determine amount of fuel required in U.S. gallons.

(3) Electrical equipment and auxiliary power unit (APU) off.

(4) Ensure fuel is of correct type and grade.

(5) When fueling from mobile vehicle, ensure that the vehicle is properly grounded and positioned parallel to the wings where

possible and that the brakes are set or wheels chocked on the vehicle and the aircraft.

(6) When fueling from a pit or hydrant, position aircraft so that it may be easily pulled away if an emergency should arise. Ground dispenser to aircraft and fuel hose nozzle to aircraft BEFORE TANK IS OPENED.

(7) Ensure fuel is free of contamination (water check). Suitable testing kits will be carried aboard each mission management aircraft.

(8) Ensure that adequate fire fighting equipment is available and attended. If a fire truck is not available, the minimum number and size extinguisher(s) required for a fueling/defueling operation is determined by volume of fuel dispensed in gallons per minute: i.e., up to:

(a)	200 G.P.M.	one 20-B extinguisher (30 lbs. hand unit).
(b)	200/350 G.P.M.	one 80-B extinguisher (100 lbs. wheel unit).
(c)	350+ G.P.M.	two 80-B extinguisher(s) (100 lbs. wheel unit).

(9) No open flame and no smoking permitted within 100 feet of fueling operation.

(10) When fueling in inclement weather, ensure that precautions are taken to prevent moisture from entering the fuel cells.

(11) In the event that fuel is spilled, the operation will be stopped immediately and resumed only after the spill is cleaned up or area flushed with water, or foam, depending on spill size. Any spill over 6 feet in any dimension is extremely hazardous, and the emergency crew will be called immediately. If emergency crew is not available, the crew will stand by with

available fire fighting equipment until the situation is corrected.

(12) When fueling from a source other than fixed facilities, the operation will be accomplished in an area clear of hangars and congested parking, if possible.

(13) It is recognized that at enroute airports fueling regulations may not be complied with in detail under all operating conditions because of circumstances beyond the control of the aircraft operator/activity. However, all necessary precautions will be taken in order to provide adequate protection for personnel and government property involved.

3. Water/Methanol

a. Specification. Water/methanol mixtures used in NASA mission management aircraft will be of the specific percentages specified by the aircraft and/or engine manufacturer.

b. Contamination. Each new batch of water/methanol mixture will be tested to determine that no contamination exists.

c. Containers. All containers in which water/methanol mixture is stored will be of an approved noncorrosive type, preferably stainless steel. Each container will be properly marked for positive identification.

d. Spillage. The water/methanol mixture is highly flammable and an active paint remover. In the event it is spilled on the aircraft, the affected area will immediately be flushed with fresh water to reduce fire hazards and prevent damage to painted surfaces.

e. Personnel Hazards. Personnel handling water/methanol must be alert to its danger. It is extremely irritating to the eyes and skin and poisonous if taken internally. Procedures will be published and available so that immediate aid may be rendered to personnel overcome by fumes or otherwise contaminated by water/methanol mixtures.

4. Oil Service

   a. Specifications. Only the type and grade of oil specified by the applicable aircraft or engine manufacturer will be used in servicing the engines, APU, and other accessories of mission management aircraft.

   b. Contamination. Care will be exercised to prevent contamination during the transfer of oil from the container to the main engine, APU, or turbine. Equipment will be kept scrupulously clean. Containers with unused oil remaining in them will be resealed to prevent contamination.

   c. Checking Oil Level. The level of oil will be checked at time specified by the applicable aircraft or engine specification.

5. Hydraulic Service

   a. Only the type of fluid recommended by the applicable aircraft manufacturer's specifications will be used in servicing the hydraulic system of mission management aircraft.

   b. The chief of aircraft maintenance will establish local procedures covering proper servicing to prevent hydraulic system contamination. Containers and equipment will be kept scrupulously clean. Containers with unused fluid will be sealed to prevent possible contamination.

6. Oxygen Service. When servicing the aircraft oxygen system, the individual assigned this function is responsible for ensuring:

   a. Correct type and grade of oxygen is used.

   b. Clothing and hands of the operator are free from oil and grease.

   c. Equipment is clean and free of oil, grease, and dust.

   d. Oxygen system is serviced in accordance with manufacturer's instructions.

APPENDIX A - LOCAL OPERATING PROCEDURES

This Appendix is intended to provide Field Installations with a convenient means for establishing policies, procedures, and instructions considered necessary to effectively manage their mission management aircraft. Copies of these procedures should be forwarded to the Aircraft Management Office, Code JIF, NASA Headquarters.